Advanced TV

Advisory Committee on
Advanced Television (ATV) Service

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Minutes of Thirtieth (April 22nd 1992) meeting of **Working Party 3 - Economic Assessment** of the Systems Subcommittee

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Federal Communications Commission
Office of the Secretary

1.0 Call to Order:

The meeting was called to order by chairman L. Thorpe at 9:10 AM at NCTA headquarters in Washington, D.C. This meeting was a joint meeting with IS WP-2 and also included representatives of the ATV System Proponents.

2.0 Agenda:

The agenda published in the meeting notice was as follows:

2.1 Approval of Minutes of March 21st WP-3 meeting.

2.2 Review of ATV Proponent replies to ATV Receiver Specialist Group 6 Questionnaire.

2.3 Presentation by ATV Proponents on their respective ATV Encoder Modulation Systems - from viewpoint of detailed cost analysis.

2.4 Detailed review of ATV Proponent implementation of Broadcast System for Local Television Station.

3.0 Attendees:

A list of attendees is enclosed as **Attachment #1**

4.0 Approval of Minutes:

The chairman reported that no minutes had been prepared for the joint SS WP-3/IS WP-2 meeting of March 20th 1992 due to absence of our secretary and the pressure of NAB related tasks. These minutes will hopefully be submitted prior to the May 20th meeting.

5.0 New Participants in SS WP-3:

Due to the impending heavy workload of SS WP-3 relating to the cost analyses of the contending ATV systems and the nature of the now quite detailed ATV system evolution, the chairman had (following the March 20th '92 meeting) written to a number of broadcasters and professional television equipment manufacturers seeking their active participation in our work over the next five months. It was encouraging to note a very positive response to this request in the marked increase of new participants who showed up for this April 22nd meeting. We plan to extend this participation even further over the next couple of months.

6.0 Background summary:

The chairman made a short presentation to review the work to date of SS WP-3 and to summarize the status of:

- System block diagram of the "transitional" ATV local broadcast station - developed in concert with IS WP-2 (**attachment #2**)

- The cumulative "growth curve" showing the quantity of ATV encoders expected to be manufactured in the early years of inauguration of ATV services (**attachment #3**)

  Note: this curve was updated during this meeting to reflect the discussion which identified that a "minimum" quantity of ATV encoder prototypes will be produced shortly after the FCC Report and Order to support television receiver manufacturer's development programs on related ATV home receivers. **Attachment #3** reflects this update.

7.0 ATV Proponent Presentations:

As agreed at our prior March 20th meeting, the chairman wrote to all ATV Proponents requesting their preparation of preliminary material for formal presentation to this meeting to instigate the first level of examination of the manufacturing cost of the ATV encoder. The letter also urged a formal response to WP-3 Specialist Group on ATV receiver's questionnaire. This letter is **attachment #4.**

Regretfully, no ATV Proponent had prepared any material on the ATV encoder.

Only Zenith/ATT returned a response on the ATV receiver questionnaire.

The chairman stressed the urgency of pro-active participation of the ATV Proponents and pointed out that only four months of work remain to support the heavy effort expected throughout the month of September in writing the final SS WP-3 report on all systems. The magnitude of the task of cost assessment must not be underestimated and a tardy participation by any ATV Proponent could seriously jeopardize their overall assessment. Cost issues constitute **3** out of the **10** selection criteria. A very substantive presentation of information by all proponents was stressed as being mandatory for the **May 20th** meeting if our overall work is to have any chance of being brought to fruition.

8.0 ATV Proponent "Information Package"

An extensive discussion followed was directed at the specific form of the information deemed necessary for a beginning of our cost analysis. H. Gaggioni made a presentation that gave an overview of the methodology applied by the MPEG selection committee to do a comparative "complexity and functionality" analysis of more than 30 contending proposals for the MPEG 1 encoder-decoder systems. This helped focus our discussion to the importance of a system block diagram of sufficient detail to allow professional television equipment manufacturers to make a rigorous cost assessment of the ATV encoder/modulators.

It was finally agreed that the analysis of the ATV encoder would best begin with two separate "information packages" from each ATV Proponent:

- **Conceptual** block diagram - accompanied by a written description - intended to familiarize all SS WP-3 members with the functionality of the encoder/modulator system. Per the choice of the individual proponent - this may or may not be similar to the information already supplied to SS WP-1.

- **Detailed** block diagram - accompanied by clear information (relating to each subsection) that takes into account

    - Speed
    - Bus Widths
    - Assumptions on technology used
    - Number of multipliers and adders
    - Memory size and organization
    - Precision of calculations

and any other relevant information that might aid the analysis.

At the urging of some WP-3 members it was agreed that this information would be supplied no later than **May 6th** to L. Thorpe who would arrange for

its distribution to a special task force of professional television equipment manufacturer representatives - identified as:

Frazier Morrison	-	Ampex
Fred Van Roussell	-	BTS
Peter Symes	-	GVG
Jim Gaspar	-	Panasonic
Hugo Gaggioni	-	Sony

This task force will immediately review the package and report back to the ATV Proponents (by May 16th) if it is felt that this is lacking in any way. This will afford the proponents an opportunity to refine the package prior to a formal presentation by each at our next WP-3 meeting on **May 20th** 1992.

9.0 The Transitional ATV Television Station:

The block diagram of the ATV transitional station (**attachment #2**) was again reviewed in detail. It was emphasized by some of the broadcasters present that WP-3 must be cognizant of the need to encourage local broadcast station commitment to conversion to an ATV service - and that this could only be done by defining the very lowest cost "minimum" system that would allow an easy entry into an early phase system. A vigorous discussion ensued on all that might constitute the "minimum" system - with a broad consensus finally producing the following guidelines:

- The only true ATV signal in the early phase would be a compressed ATV signal received from the network
- Local station ID, local emergency messages, and local commercials would all be upconverted 525 NTSC
- Routing might constitute a simple patch panel or the most rudimentary of manually operated electronic switch
- The ATV signal itself would never be decoded - and insertions of commercials etc would be full screen picture replacements.

It was further advocated that a second version of a "minimum" system should be defined which functionally would be very similar to the first - but would utilize ATV signals for network programming, pre-recorded commercials, station ID and local emergency messages.

Chairman L. Thorpe and M. Weiss agreed to prepare two block diagrams which would clearly detail both versions of the minimum system.

10.0 The ATV Commercial Playback VTR:

A separate discussion was held to elaborate on some preliminary thinking regarding a proposed ATV VTR that most members considered mandatory to facilitate the early systems. Most members insisted this must be a new VTR capable of recording and playing back a compressed ATV signal (that is, compressed according to the ATV transmission standard). In the interest of low cost the conclusion reached by the attendees was that such a VTR would require no editing or "stunt" modes - with only a fast shuttling capability (accompanied by perhaps a low resolution picture). VTR manufacturers present were asked to comment on the feasibility and probable costs of such a VTR at our next meeting.

11.0 Handling of Compressed ATV Signals in the Television Station:

This discussion was sparked by the attempt to better define the "minimum" transitional television station. Issues of routing, recording, monitoring, and post production of compressed ATV signals were widely discussed. IS WP-2 reported that virtually all ATV Proponents claimed that clean video "cuts" could be achieved on their compressed ATV signals although in some instances a delay of some frames might be incurred. Following discussion with the broadcasters present it was generally felt that a delay of up to 10 frames would be acceptable in such a "minimum" system. All proponents said that basic production facilities such as wipes, fades, keys, DVE manipulation would require prior decoding of their compressed signals to a baseband signal format.

On this basis it was agreed that the minimum system for cost assessment would assume straight passthrough of the network feed of a compressed ATV signal (which would incur no decoding to baseband).

While the very minimum system would keep costs to an absolute minimum by the expedient (in the very early days) of using commercials for the ATV channel that had been originated as 525/4:3 NTSC (and upconverted to the ATV signal format) - a more sophisticated version likely to be employed by major market stations would instead use commercials that were produced in HDTV but delivered to the station as a compressed video recording directly compatible with the ATV compressed signal. It was the consensus of those present that SS WP-3 should properly cost analyze both options. We agreed to do so.

12.0 ATV Receiver Specialist Group:

Ralph Justus, chairman of WP-3's Specialist Group on ATV receivers reported that only Zenith/AT & T had so far responded to their questionnaire. This was very disappointing and was further indication that most ATV Proponents still do not assign a proper priority to the cost assessment criteria of the total selection process. The chairman again exhorted the proponents to more

aggressively participate in the casting process as considerable work must be done over the remaining four months of our task.

The generic ATV receiver block diagram developed by the Specialist Group was reviewed and guidelines outlined to help the ATV Proponents prepare their respective information packages for cost assessments.

13.0 Letter from Thomson Consumer Electronics Inc.:

Chairman L. Thorpe reported on a letter received from Thomson Consumer Electronics Inc. recommending the use of calendar years for our forecast growth curves of ATV systems. We agreed to implement this change - and it is now reflected in the curve of **attachment #3.**

The letter of Thomson Consumer Electronics is **Attachment #5**

14.0 Next Meeting:

To maintain the accelerated pace of our work it was agreed to meet on a monthly basis. The next meeting of WP-3 was accordingly scheduled for **Wednesday, May 20th** from 9:00 AM to 4:00 PM. It was also agreed that we will continue our back to back meetings with IS WP-2 - they will meet on Tuesday May 19th. A meeting notice will be sent out the week of April 27th to confirm place of meeting - in Washington D.C.

14.0 The meeting was adjourned at 3:25 PM.

Attachment #1

List of Attendees

At
SS WP-3
Meeting of April 22nd 1992

SS WP-3
Meeting NCTA
April 22nd 1992

NAME	AFFILIATION & ADDRESS	PHONE/FAX
Rita McDonald	FCC--1919 M St. NW. Wash. 20554	202/632-5414
CHARLES HEWER	ZENITH 1000 MILWAUKEE AVE GLENVIEW IL 60025	708 391 8531
ROBERT J. ROSS	KHW-TV GROUP W INDEPENDENCE MALL EAST PHIL, PA	215-238-4952 215 238 4907 FAX
KAZUHIKO INAGAKI	15030 AVENUE OF SCIENCE, SAN DIEGO CA. 92128. SONY.	(619) 673-3205 0139 (FAX)
Takaaki Ota	Sony 3 Paragon Dr. Montvale NJ 07645	201-358-4269
KAY S KINNEAR	Philips Labs 345 Scarborough Road Briarcliff Manor, N.Y. 10510	(914) 945-6088 " " 6500 FAX
FRED J. VAN ROESEL	RTS RAHWAY 535 EAST CRESCENT AVE N.J. 07066	(201) 818 4000 FAX (201) 818 4002
C.B. PATEL	Samsung, 1009 Lenox Dr. #207 Lawrenceville NJ 08648	609-896-3738 PH 3748 FAX
CHUCK WILK	CORP. FOR PUBLIC BROADCASTING 901 E. ST., N.W. WASHINGTON, D.C. 20004	(202)-879-9673 FAX: (202)-783-1019
DAVID CHILSON	CAPITAL CITIES/ABC 47 W 66 ST. NY NY 10023	(212) 456-3663 FAX -3852
James Kutzner	PBS 1320 Braddock Place Alexandria VA 22314	(703) 739-5473 FAX -8938
Stan Baron	NBC 30 Rockefeller Plaza (1600W) New York, NY 10112	Tel: (212) 664-7557 FAX: 212(664)-5219
DAVID FOLSOM	WCNC-TV PROVIDENCE-JOURNAL BROADCASTING 1001 WOODRIDGE CTR DR	(704) 329-3632 FAX (704) 357-4970

NAME	AFFILIATION & ADDRESS	PHONE / FAX
JIM GASPAR	PANASONIC A.I.V.L. 95E CONNECTICUT DR. 08016	(609) 386-8527/8530
JOHN G.N. HENDERSON	HITACHI AMERICA, LTD. 307 COLLEGE ROAD EAST PRINCETON NJ 08540	609-520-1322 / 8953
RALPH L. CERBONE	AT&T-MICROELECTRONICS 2 OAK WAY BERKELEY HTS, NJ 08833	908-771-3952
JUKKA HAMALAINEN	MATSUSHITA AUD. RES. LAB 95D CONNECTICUT DR. BURLINGTON N.J. 08016	609-386-5995/4999
HUGO GAGGIONI	SONY Advanced Systems 3 Paragon Drive M.S. N270 Montvale, NJ 07650	(201) 358-4261
JUN TAKAYAMA	SONY 4-14-1 ASAHICHO, ATSUGI KANAGAWA, JAPAN	+81 462 30 5733/5168
FRASER MORRISON	AMPEX RECORDING SYSTEMS CORPORATION 401 BROADWAY, MS 3-59 REDWOOD CITY, CA. 94063	415-367-3288/4104

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NAME	AFFILIATION/ADDRESS	PHONE/FAX
Ronald Lee	Zenith 1000 N. Milwaukee Ave Glenview, IL. 60025	(708) 391-8384 FAX #8555
Peter Lambert	Broadcasting Mag. 1705 DeSale St. NW West. DC 20036	(202) 659-2340
L. Thorpe	Sony Advanced Systems	(201) 358-4267

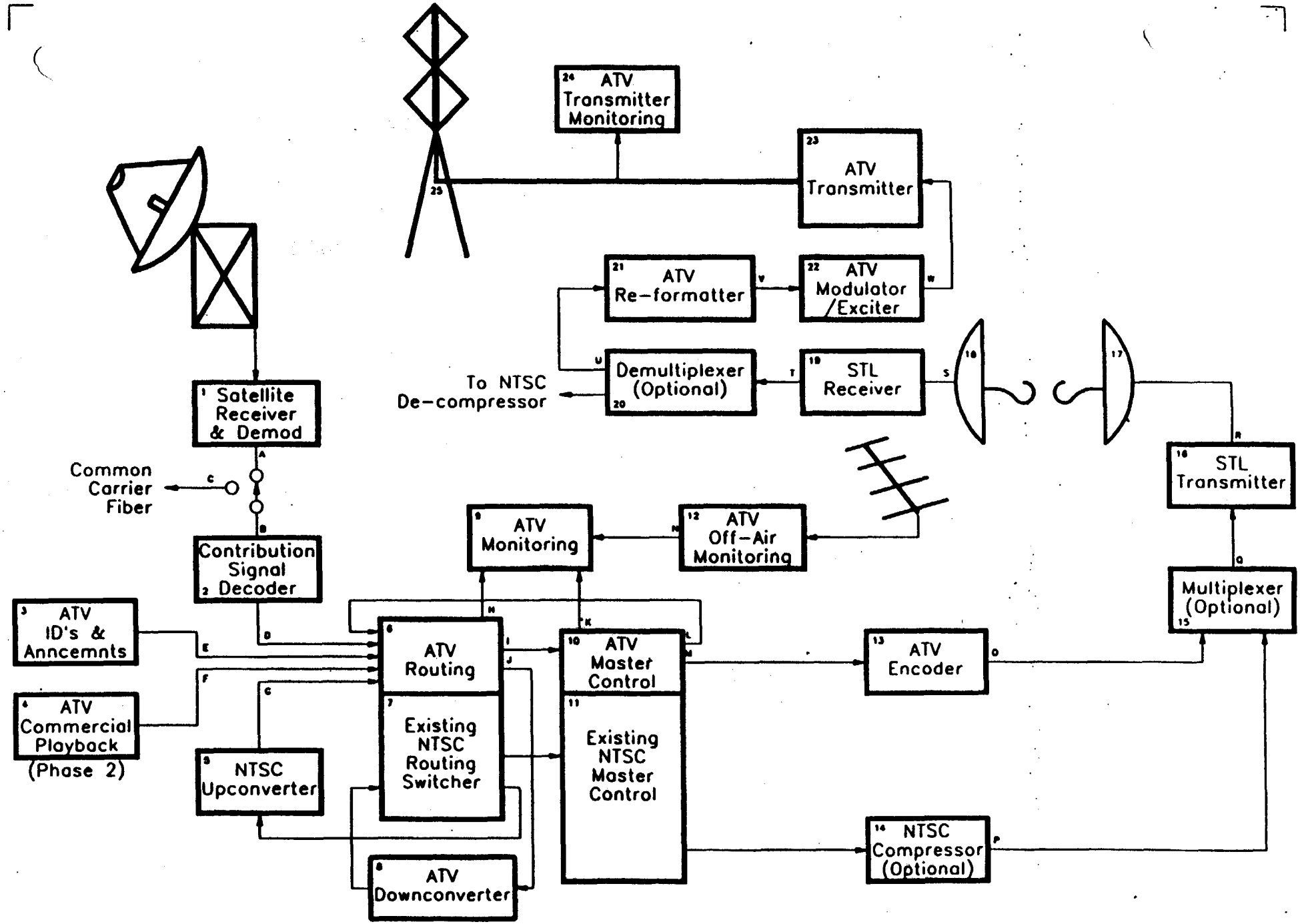
Attachment #2

Revised Block diagram

of
ATV Transitional Local Station

per
discussion with ATV Proponents

at
March 25th 1992 meeting



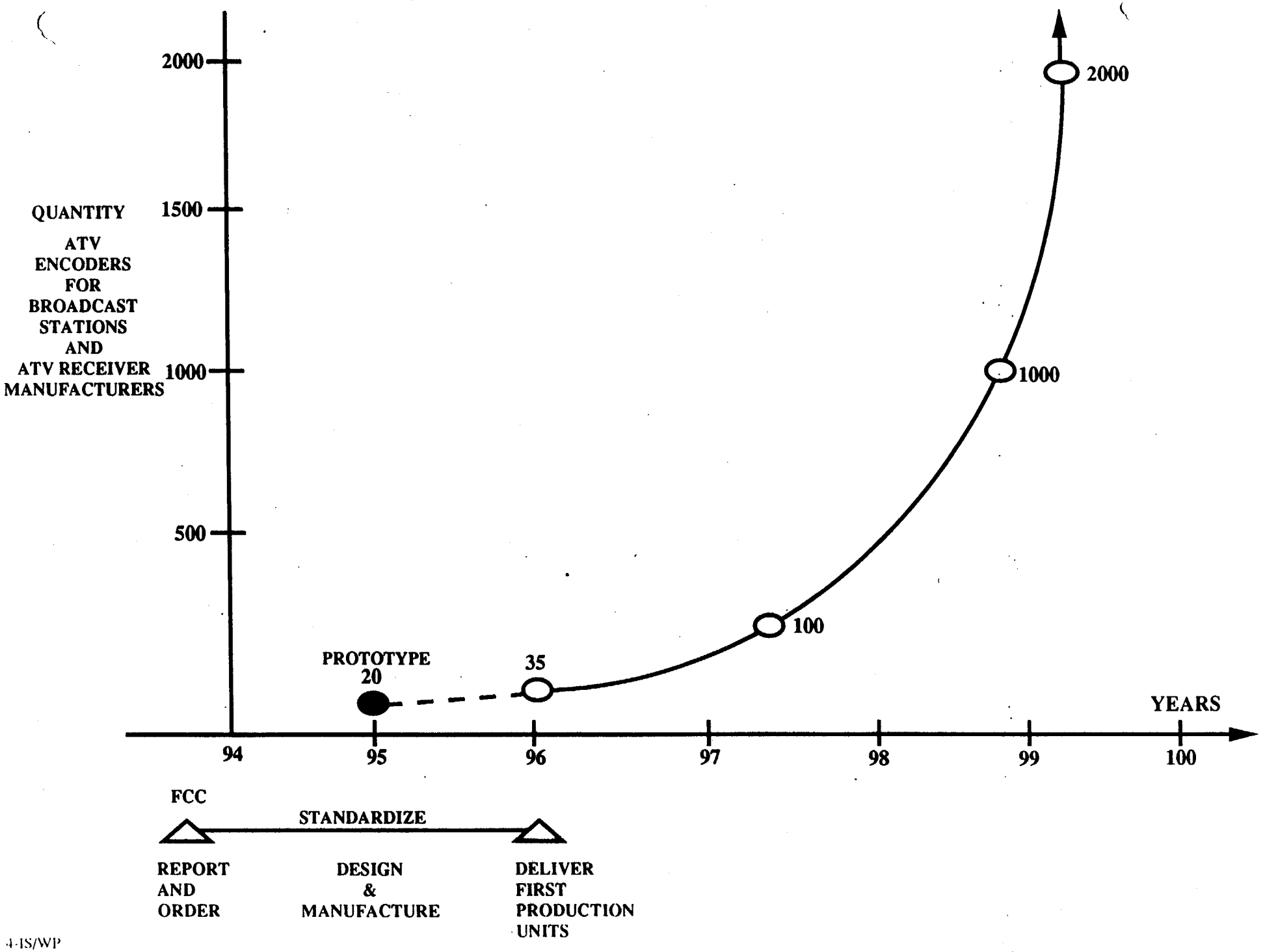
ATV Transitional Television Station

Attachment #3

Cumulative growth curve

for
ATV Encoder/Modulator Systems to support early conversion of broadcast stations

and
development labs of ATV Receiver Manufacturers

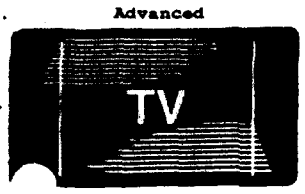

2000
1500
1000
500
QUANTITY
ATV ENCODERS FOR BROADCAST STATIONS AND ATV RECEIVER MANUFACTURERS
2000
1000
100
35
PROTOTYPE
20
YEARS
94
95
96
97
98
99
100
FCC
STANDARDIZE
REPORT AND ORDER
DESIGN & MANUFACTURE
DELIVER FIRST PRODUCTION UNITS

Attachment #4

April 2nd Letter from chairman SS WP-3 to all ATV Proponents requesting formal presentation of Preliminary Cost Information

to

April 22nd Meeting of WP-3



Advisory Committee on
Advanced Television (ATV) Service

April 2nd 1992

To: All ATV Proponents
FCC Advisory Committee on ATV Service

Dear ATV System Proponent,

Thank you for an active and positive participation in the SS WP-3 meeting on March 25th last - the first of our short series of meetings intended to achieve a fair and credible economic assessment of your proposed ATV system. I had commented at the opening of that meeting that this process would not be easy - and indeed would be demanding of your time and patience - when you and your team are heavily engaged in refining your technological developments. I believe this meeting served as a useful bellweather as to the nature of our forthcoming sessions.

However, that first general session (which included all ATV Proponents) was perhaps less efficient than we all might hope for our future meetings. This was inevitable. New ideas were presented for the first time and few were sufficiently prepared to deal with specifics. Certain general concepts had to be clarified.

Nevertheless, an understanding of the SS WP-3 process did emerge and I believe you and your colleagues will be able to impart a better focus to your preparations for our next meeting on April 22nd. It is toward the goals of that meeting that I would like to direct the comments and recommendations in this letter:

1.0 ATV Receiver Questionnaire:

We clarified that the former "**draft**" **questionnaire** - earlier distributed to you all by ATV Receiver Specialist Group 6 - is now a formal list of questions to which we solicit your detailed response. This response must be in writing and it is highly desirable it be forwarded to chairman Ralph Justus **prior** to the April 22nd meeting to allow time for him to circulate this to all SS WP-3 members.

Please understand that this is a first level of questioning. There may well be more later.

2.0 As chairman of the ATV Encoder Specialist Group I would ask you to come to our April 22nd meeting also prepared to make a formal presentation on your specific **ATV Encoder/Modulation Subsystem.** Your preparation of this material should be motivated and guided by your desire to furnish us with as much information as possible to allow a cost assessment of this portion of your subsystem. This material should include (but not be confined to):

- Detailed block diagram
- Clear delineation of all key functions
- Description of physical partitioning and packaging of each section of the subsystem
- PC board details (number of , dimensions, some account of component density, identification of custom chips and standard components, identification of expensive components etc
- Clarification of any packaging and electronic partitioning that allows physical separation of elements of this subsystem (e.g. encoder from modulator)
- Any pictures or drawings of the physical units
- Information relating to any changes proposed for your first small-volume "product" versus the prototype you are submitting to ATTC

3.0 **System Specifics** will constitute a central element of the SS WP-3 economic assessment. It must. We have been charged with assessing the "Cost to Broadcasters" and the "Cost to Alternative Media". As emerged at our March 25th meeting these costs are bound up in the total system it will take to implement a properly functional Network Pass Through (and Local Commercial insertion) ATV service.

The discussion of March 25th pointed out that there should be two "extremes" dealt with for the local television station: one will be a major market station that will demand a fully-functional system with all the facilities of today's 525 NTSC system (for network passthrough and commercial insertion); the second, will speak to a "minimal"

system that will allow a small station to get such an ATV signal on the air with an absolute minimum of equipment investment.

A block diagram for the former will be prepared by IS WP-2 and SS SP-3 and will be forwarded to you prior to the next April 22nd meeting. We are asking you to furnish your version of the "minimum" system - as you envisage its implementation with your specific ATV equipments and concepts.

4.0 Compressed ATV Video handling within the ATV broadcast plant surfaced as a major topic of discussion at our last meeting. Each proponent made various claims in this area. Questions were raised on related topics - including:

- VTR recording of such compressed signals
- Routing of compressed ATV video
- Monitoring of compressed ATV video
- Direct insertion of station ID, local emergency messages, and local commercial into compressed ATV video
- Downconversion from ATV to NTSC
- Upconversion from NTSC to ATV

etc

All of these issues are central - indeed crucial - to the real and practical implementation of an ATV broadcast system. They have a direct bearing on the **cost to broadcasters** - and to **alternative media**. Proposals are being put forward in the area of handling compressed digital video that have no technical precedent. The charter of SS WP-3 clearly charges that we establish **technical feasibility** as an integral part of our overall cost assessment.

We will therefore be placing a high priority on all aspects of the ATV signal handling in the television plant (broadcast, cable etc). I'm not sure all of the questions we will raise can be dealt with in one meeting. But that process will begin at the April 22nd meeting. To the best of your ability, I therefore urge you to give a special consideration to the ATV system-handling as it pertains to your specific ATV proposal. Be prepared to elaborate - in detail - on your proposed implementations. I plan to assemble professional broadcast equipment manufactures and broadcasters to help assess the proposals put forward.

5.0 I'm sensitive to the fact that verbal "ad-libbing" on complex technical topics within a large group is a less than satisfactory methodology. You saw for yourselves a little of the imperfections of this - at our March 25th meeting. It can lead to some rambling, off the cuff conjecture, and of course a certain level of confrontation.

We cannot, however, dispense with this process - it is efficient in allowing face to face exchange and rapid identification (and sometimes clarification) of vitally important issues.

Nevertheless, an argumentative process **must** be supported by clear and concise written papers. We are dealing with very substantive technical topics. I therefore urge you to flank your verbal participation in our forthcoming series of meetings with carefully prepared technical supporting material in written form. This includes cost related issues and system/implementation topics. You can judge whether they are pertinent for direction to SS WP-3 or to IS WP-2. But, as I pointed out, there is already a close alliance between these two working parties - born of the necessity for ACATS to get a total assessment of all of the merits of each ATV proposal.

Please come as well-prepared as possible to our April 22nd meeting. Your positive contribution will be invaluable to our difficult task - and a contribution to the inevitable advancement of ATV in the U.S.

I look forward to seeing you in Washington.

Respectfully,

Laurence J. Thorpe
Chairman SS WP-3
FCC ACATS

c.c.: I. Dorros
J. Flaherty
M. Weiss
R. Stowe
R. Justus

All ATV Proponents

Dr. Keiichi Kubota, NHK (NY) - NHK (Japan Broadcasting Corporation)

Dr. J. Peter Bingham - Philips Laboratories

Mr. James E. Carnes - David Sarnoff Research Center

Mr. Ralph L. Cerbone	-	AT & T Microelectronics
Dr. C.A.A.J. Greebe	-	Philips Laboratories
Dr. Jerrod A. Heller	-	General Instrument Corporation
Mr. Takehiro Izumi	-	NHK (Japan Broadcasting Corporation
Dr. Scott A. Keneman	-	David Sarnoff Research Center
Professor Jae S. Lim	-	Massachusetts Institute of Technology
Mr. Wayne C. Luplow	-	Zenith Electronics Corporation
Mr. Amihai Miron	-	North American Philips Corporation
Mr. Arun N. Netravali	-	AT & T Bell Laboratories
Mr. Yozo Ono	-	NHK (Japan Broadcasting Corporation)
Dr. Wood H. Paik	-	General Instrument Corporation
Mr. Robert H. Plummer	-	David Sarnoff Research Center
Mr. John T. Preston	-	Massachusetts Institute of Technology
Mr. Robert Rast	-	General Instrument Corporation
Mr. Quincy Rodgers	-	General Instrument Corporation
Dr. Masao Sugimoto	-	NHK (Japan Broadcasting Corporation)
Mr. Stanley Zachary	-	Zenith Electronics Corporation

Attachment #5

Letter from
Thomson Consumer Electronics Inc.

to
SS WP-3

D. Joseph Donahue
Senior Vice President
Technology and Business Development

Telephone: (202) 872-0672
Facsimile: (202) 872-0674

RCA

April 6, 1992

Mr. Larry Thorpe, Chairman
Sony Advanced Systems
3 Paragon Drive, MD 2N70
Montvale, NJ 07645-1735

Dear Larry:

Forward planning is an important ingredient of any new adventure, such as the introduction of HDTV. The requirement of forecasting events, sales, etc., etc. does force one to analyze and think. When a specific forecast is made, it establishes a record of the conclusions at that moment and serves as a reference point to later reviews. Most all forecasts have to be updated from time-to-time because of new information and insights.

These introductory remarks pertain to the suggestion I made at your last meeting that forecasts, such as the attached chart, should always use specific calendar years instead of some floating start point. The potential change in the starting point is just one of many variables what may have to be adjusted in a subsequent analysis. Actually, the error in specifying years could be one of the smaller errors. With specific dates, every one knows what the author was thinking at the time of the forecast. The attached doesn't give me this.

One example of the impact of calendar years on an analysis is IC cost. Totally independent of the HDTV process, IC technology is moving forward. Note from attached that it is forecasted that much more electronics will be placed on a given sized IC in 2002 than in 1992. My calculation, using this forecast, is a ratio of 17.4. That is a huge factor that will greatly impact IC cost.

Simply, all forecasts should show calendar years.

Please take these comments in the constructive manner in which they are intended.

Sincerely,

D. Joseph Donahue

Thomson Consumer Electronics, Inc.

Suite 601, 1200 19th Street, N.W., Washington, D.C. 20036

DEC's Alpha roadmap

Year*	Technology	Wafer size	Transistors (millions)	MHz**	Line width (Microns)
1992	CMOS-4	6-inch	1.68	150-200	.75
1993	CMOS-5	6-inch	4	225-275	.50
1996	CMOS-6	8-inch	10	325-375	.35
1999	CMOS-7	8-inch	30	450-525	.25
2002	CMOS-8	8-inch	100	675-750	.18

*Year of manufacturing capability, not availability of computer systems
**Estimates based on industry average gain of 30% a year

Source: DEC